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Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.09/KRIDL/WMM/Gradation/2013-14

06.08.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to drains and roads of Thindlu Vidyaranyapura and other areas in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : AEE/BBMP/VSD/PR/296/2013-14 Dated: 22.03.2014

Date of Testing : 06.08.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **25775**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	745	745	2.9	97.1	95-100
22.4	6512	7257	28.2	71.8	60-80
11.2	4794	12051	46.8	53.2	40-60
4.75	3692	15743	61.1	38.9	25-40
2.36	3593	19336	75.0	25.0	15-30
0.600	4256	23592	91.5	8.5	8-22
0.075	1858	25450	98.7	1.3	0-8

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ವಿದ್ಯಾರಣ್ಯಪುರ ಉಪ ವಿಭಾಗ
ಯಲಹಂಕ ವಲಯ,
ಬ. ಬೆಂ. ಮ ಪಾ. ಬೆಂಗಳೂರು-೯೧

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/Bitumen/2013-14 27.08.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS : 2386 and IRC : SP : 11 - 1984

CLIENT	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to drains and roads of Thindlu Vidyaranyapura and other areas in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	AEE/BBMP/VSD/PR/296/2013-14 Dated: 22.03.2014
SAMPLE I/D	Roads in Thindlu Vidyaranyapura and other areas in Ward No. 09
DATE OF TESTING	27.08.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	477	476
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	23	24.00
7. Bitumen content in %	4.60	4.80
8. Average	**4.70**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	27.98	5.87	5.87	94.13	90-100
4.75	246.38	51.65	57.52	42.48	35-51
2.36	53.14	11.14	68.66	31.34	24-39
1.18	48.65	10.20	78.86	21.14	15-30
0.3	38.96	8.17	87.03	12.97	9-19
0.075	34.27	7.18	94.21	5.79	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	26.78	5.36	5.36	94.64	90-100
4.75	245.32	49.06	54.42	45.58	35-51
2.36	89.65	17.93	72.35	27.65	24-39
1.18	46.15	9.23	81.58	18.42	15-30
0.3	25.87	5.17	86.75	13.25	9-19
0.075	41.61	8.32	95.08	4.92	3-8

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06.08.2014

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to drains and roads of Thindlu Vidyaranyapura and other areas in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/BBMP/VSD/PR/296/2013-14 Dated: 22.03.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	06.08.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	378	382	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	78	82	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines	20.63	21.47	
	100* (W_2/W_1)%			**21.05**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.09/KRIDL/WMM/S-T/2014-15 06.08.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of Work	Improvements to drains and roads of Thindlu Vidyaranyapura and other areas in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/BBMP/VSD/PR/296/2013-14 Dated: 22.03.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	06.08.2014

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **11.29%**

Elongation Index = **13.67%**

Result : Combined Flakiness & Elongation index **24.96%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/AIV/2014-15

27.08.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to drains and roads of Thindlu Vidyaranyapura and other areas in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/BBMP/VSD/PR/296/2013-14 Dated: 22.03.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	27.08.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	381	385	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	81	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.26	22.08	**21.67**

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/Shape_T/2014-15 27.08.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of Work	Improvements to drains and roads of Thindlu Vidyaranyapura and other areas in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/BBMP/VSD/PR/296/2013-14 Dated: 22.03.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	27.08.2014

Result : Flakiness Index = **11.52%**

Elongation Index = **13.97%**

Result : Combined Flakiness & Elongation index **25.49%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/Stripping/2014-15 27.08.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the work	Improvements to drains and roads of Thindlu Vidyaranyapura and other areas in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/BBMP/VSD/PR/296/2013-14 Dated: 22.03.2014
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	27.08.2014

Type of binder : 60/70
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	2.6	2.80	97.20
2	2.8		
3	3.0		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.09/KRIDL/Sp_Wa/2014-15 27.08.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to drains and roads of Thindlu Vidyaranyapura and other areas in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/BBMP/VSD/PR/296/2013-14 Dated: 22.03.2014
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	27.08.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2012	2013	2015	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1257	1258	1260	
4	Weight of saturated surface dry aggregate in air	W_3 g	2010	2012	2015	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	753	754	755	
6	Weight of oven dried aggregate	W_4 g	2000	2003	2004	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.656	2.656	2.654	2.656
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.692	2.689	2.694	2.691
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.50%	0.45%	0.55%	0.50%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0

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